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U.S. ATOMIC ENERGY COMMISSION

REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

REGULATORY GUIDE 5.4

STANDARD ANALYTICAL METHODS FOR THE MEASUREMENT OF URANIUM TETRAFLUORIDE (UF₄) AND URANIUM HEXAFLUORIDE (UF₆)

A. INTRODUCTION

Paragraph 70.22(b) of 10 CFR Part 70 "Special Nuclear Material," requires, in part, an applicant for a license to possess certain quantities of special nuclear material in unsealed form to describe his procedures for control of and accounting for special nuclear material. This guide identifies acceptable methods for subsampling and chemical and isotopic analysis of uranium tetra- and hexafluoride which an applicant may specify as part of his procedures for accounting for special nuclear material.

B. DISCUSSION

Subcommittee N15-2, Measurements, of the American National Standards Institute (ANSI) Standards Committee N15 on Methods of Nuclear Materials Control has developed standards containing analytical standards for the measurement of uranium tetrafluoride and uranium hexafluoride. These standards, ANSI N15.6-1972 ("Analytical Standards for Accountability of Uranium Tetrafluoride")¹ and ANSI N15.7-1972 ("Analytical Standards for the Accountability of Uranium Hexafluoride")¹, were approved by ANSI on April 20, 1972. The measurement methods are intended to apply to materials that meet existing

uranium hexafluoride purity specifications of the USAEC. Materials containing impurities at levels above these specification limits require the use of supplemental procedures to obtain satisfactory uranium accountability.

C. REGULATORY POSITION

The analytical standards for the measurement of uranium tetrafluoride contained in ANSI N15.6-1972 and for the measurement of uranium hexafluoride contained in ANSI N15.7-1972 are generally acceptable to the AEC Regulatory staff and provide an adequate basis for the subsampling, the gravimetric determination of uranium content, the spectrographic determination of metallic impurities, the isotopic analysis by mass spectrometry, and the determination of uranium isotopic abundance by thermal ionization mass spectrometry of uranium tetrafluoride and uranium hexafluoride that meet the existing uranium hexafluoride purity specification of the USAEC (32 F.R. 16289, "Uranium Hexafluoride - Base Charges, Use Charges, Special Charges, Table of Enriching Services, Specifications, and Packaging").

¹Copies may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

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